REMARKS

Claim Objections

The examiner objected to claims 3-6 under 37 CFR §1.75(c) for failing to further limit the subject matter of a previous claim. In particular, the examiner asserts that these claims are not drawn to any further apparatus limitations. The applicant respectfully disagrees.

Claims 3-6 further limit apparatus claim 1 by introducing offset parameters 13 as shown in FIG. 2. The offset parameters 13 are essentially a data structure that may be implemented in hardware or firmware. Data structures are given patentable weight as structural limitations to an apparatus claim covering a machine such as a disk drive (see MPEP §2106(IV)(B)(1)(a)). The applicant respectfully requests the examiner to withdraw this objection.

Claim Rejections

The examiner rejected independent claims 1 and 7 under 35 USC §102 as anticipated by Smyers (US 6,721,859) and also rejected independent claims 1 and 7 under 35 USC §103 as unpatentable over Smyers in view of a number of other references and as unpatentable over Fung et al. (US 6,523,058) in view of Ando et al (US 6,341,196). The applicant respectfully disagrees.

The applicant concedes that there are references, such as Smyers, that teach a disk drive (or method) for storing both asynchronous data and isochronous data. The applicant discussed such prior art disk drives in the background of the specification, and in particular, on page 2, lines 7+, "The disk within an isochronous/asynchronous disk drive is typically divided into an isochronous partition for storing the isochronous data and an asynchronous partition for storing the asynchronous data." The problem with the prior art which is overcome by the embodiments of the present invention is described on page 7, lines 15+:

"It is desirable to support the concurrent (interleaved) transfer of both asynchronous and isochronous data to and from the disk drive. If the isochronous and asynchronous partitions are contiguous as illustrated in FIG. 1, the maximum seek distance may be from the inner diameter track of the disk to the outer diameter track. If the disk drive is directed to make multiple interleaved accesses to data located at the ends of the partitions, the cumulative seek times may interfere with access to the time-constrained isochronous data. In addition, if the disk drive is required to frequently seek between the asynchronous and isochronous data in order to satisfy the isochronous time constraints, performance in accessing the asynchronous partition may degrade."

In order to minimize the seek times in accessing the asynchronous and isochronous partitions, the claims recite to form an asynchronous partition between two isochronous partitions as illustrated in FIG. 2. An example of how this format reduces seek times is illustrated in FIGs. 3A-3B and 4A-4B describe on page 6, lines 12+:

"FIG. 3A illustrates the maximum seek distance 14 when seeking between the isochronous and asynchronous partition for the prior art disk drive of FIG. 1. In this example, the disk drive is accessing an AV stream 16 at the extreme end of the isochronous partition, while concurrently accessing (in an interleaved manner) asynchronous data 18 stored at the extreme end of the asynchronous partition. Thus, the maximum seek distance 14 when seeking between the isochronous and asynchronous data requires the entire stroke of the actuator arm. The associated seek time may interfere with the time constraints of the isochronous data, particularly if the disk drive performs multiple consecutive seeks to the end of the asynchronous partition. In addition, the maximum seek distance 14 may degrade the performance in accessing the asynchronous data 18 if the disk drive is required to seek back and forth between the AV stream 16 in order to satisfy the isochronous time constraints.

FIG. 3B illustrates how in the embodiment of FIG. 2 locating the asynchronous partition 6 between two isochronous partitions 8A and 8B significantly reduces the maximum seek distance 20A and 20B when seeking between the isochronous and asynchronous partitions. In one embodiment, the isochronous partitions 8A and 8B are equal in size such that the maximum seek distances 20A and 20B are equal in length. Also in the embodiment of FIG. 3B, the asynchronous partition 6 is much smaller than the isochronous partitions 8A and 8B. Therefore the maximum seek distances 20A and 20B are reduced in comparison to FIG. 3A to essentially one half the stroke of the actuator arm (plus one-half the length of the asynchronous partition 6). This reduction in seek distance and associated seek time improves performance by facilitating the time constraints of the isochronous partitions 8A and 8B. It also improves performance with respect to the asynchronous partition 6 by allowing more asynchronous data to be transferred to the host computer before having to seek back to the isochronous partition to satisfy the isochronous time constraints.

FIG. 4A illustrates the average random seek distance 22 when seeking between the isochronous and asynchronous partition for the prior art disk drive of FIG. 1. On average, the disk drive of FIG. 1 will access isochronous data 24 near the middle of the isochronous partition, and access asynchronous data 26 near the middle of the asynchronous partition. Thus, the average random seek distance 22 when seeking between isochronous and asynchronous data requires one-half a stroke of the actuator arm.

FIG. 4B illustrates how in the embodiment of FIG. 2 locating the asynchronous partition 6 between two isochronous partitions 8A and 8B significantly reduces the average random seek distance 28A and 28B when seeking between the isochronous and asynchronous partitions. In an embodiment wherein the isochronous partitions 8A and 8B are equal and the asynchronous partition 6 is significantly smaller than the isochronous partitions 8A and 8B, the average random seek distance 28A and 28B is essentially reduced to only one-quarter a stroke of the actuator arm (plus one-quarter the length of the asynchronous partition 6). This significant reduction in the average random seek

distance improves performance in satisfying the isochronous time constraints and improves access to the asynchronous partition 6 by allowing more asynchronous data to be transferred to the host computer before having to seek back to the isochronous partition to satisfy the isochronous time constraints.

Regarding the format limitation of having an asynchronous partition between a first and second isochrnous partition, the examiner asserts in paragraph 1 of the office action that the "sandwiching of data requiring SBP-2 accessing (asynchronous) between data requiring AV accessing (isochronous) is nothing more than an expedience in placing data files." The examiner also relies on Ando for showing in FIG. 18C a prior art disk format wherein an asynchronous file (PC file #3) is stored between two segments of an isochronous file (video file #1), and therefore asserts the format claimed by the applicant is obvious. The applicant respectfully disagrees with both of these assertions.

There is a definite benefit (reducing seek times) in having an asynchronous partition located between first and second isochronous partitions as described above. Thus, this format is more than just "expedience in placing data files" as asserted by the examiner. To sustain a rejection under 35 USC §103, the examiner is required to identify a prior art reference that suggests a benefit for the modification of the present invention. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." (In re Fritch 972 F.2d 1260; 23 U.S.P.Q.2D (BNA) 1780 (1992).)

Regarding the format disclosed by Ando in FIG. 18C, the claims recite an "asynchronous partition" and "first and second isochronous partitions". It is well known in the disk drive industry the term "partition" refers to a particular section of a disk for storing multiple files. Ando discloses a single partition (FIG. 3A) for storing multiple asynchronous and isochronous data files in an "intermingled" fashion (see FIG. 3C and

col. 7, lines 62+). Thus, the single partition format disclosed by Ando does not render obvious the multiple partition format recited in the claims. To emphasize this distinction, the applicant has amended claims 1 and 7 to recite that each partition comprises multiple contiguous tracks, and that each partition stores multiple data files. The rejection should therefore be withdrawn.

Regarding claims 3 and 9, the examiner asserts that the use of offset parameters to identify the location of partitions is well known. The applicant concedes that prior art disk drives have employed offset parameters to identify the boundaries of partitions (as opposed to identifying individual files as disclosed by Ando). However, the prior art does not disclose or suggest to use offset parameters that identify the boundary of an asynchronous partition that is "sandwiched" between two isochronous partitions.

The rejections of the remaining claims should be withdrawn for the reasons set forth above.

CONCLUSION

The above amendments to the claims do not raise new issues or add new matter; the applicant respectfully requests the examiner to enter the amendments. In view of the foregoing amendments and remarks, the rejections under 35 USC §102 and 35 USC §103 should be withdrawn. In particular, the relied upon prior art does not disclose or suggest a disk format wherein an asynchronous partition is sandwiched between two isochronous partitions. The examiner is encouraged to contact the undersigned over the telephone in order to resolve any remaining issues that may prevent the immediate allowance of the present application.

Respectfully submitted,

Date: 8/21/04 By: _____

Howard H. Sheerin
Reg. No. 37,938
Tel. No. (303) 765-1689

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on:

8/21/04 Howard H. Sheerin
(Date) (Print Name)

_____
(Signature)